

fluid gave a positive guaiac test, he was given a test meal which on removal one hour later gave a negative guaiac test. The stools contained well-preserved red blood cells, pus cells, and mucus. Bismuth roentgen-ray showed no evidence of ulceration in the stomach or the duodenum.

No systematic attempt has been made to review the literature on this subject, but all the standard medical and surgical text-books, including the various systems of medicine, surgery, and syphilis, have been consulted. The opinion is uniformly expressed that syphilis of the stomach is uncommon and that syphilis of the intestine is extremely rare.

DIVERTICULUM OF THE DUODENUM, WITH A REPORT OF A CASE DIAGNOSED DURING LIFE AND SUCCESSFULLY OPERATED ON.¹

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DIVERTICULUM of the duodenum is a rare condition and one not well known to the profession in general. It has no characteristic clinical symptomatology and, until the most recent advances in radiological diagnosis, its presence was revealed only during a postmortem examination. The writer therefore feels that the following case, diagnosed during life and successfully operated on, is of sufficient interest to be herewith reported.

CASE HISTORY.—J. L.; female; single; aged thirty-six years; fire insurance agent. Referred by Dr. S. Rosenberg. Patient was first seen by me January 5, 1915, when she gave the following history:

Her family were all rheumatic and very nervous; her mother and one brother died of heart disease. She was left very much to nurses, her dietary neglected, and she remembers that she was a weak, anemic child, very constipated, and often troubled with indigestion. She had had no acute illnesses since childhood, though always thin and pale. Her constipation has persisted despite manifold measures and drugs, and she has often passed large amounts of thick, ropy mucus, with or without feces. In addition, since childhood, she has been troubled more or less with "sour stomach" (heartburn, acid belching, distention, flatulence, etc.), particularly after

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partaking of sweets, acids, fruits, etc. At times there was even an aching pain in the upper right quadrant, coming on about one hour after meals. These manifestations of gastric indigestion always yielded to strict attention to diet. For years she was troubled with hemorrhoids and rectal fissure, being finally cured, after several previous operations, three years ago by Dr. Kelsey. Six years ago she was operated on for appendicitis at St. Mary's Hospital in



FIG. 1.—Taken prone a few minutes after the bismuth meal. Stomach very active, duodenal cap normal. Note the large round, bismuth-filled pouch between the second portion of the duodenum and the pyloric antrum, apparently communicating with the latter.

Brooklyn. The appendix, she was told, was "large and inflamed, and contained a little pus." Her indigestion, however, was not relieved by any of these operations; on the contrary, it has become progressively worse, and since several months has been particularly distressing despite most careful dieting and medicinal measures. A most annoying symptom has been a sharp, aching pain below the gall-bladder region, occurring one or two hours after meals and lasting for some time.

Status Presens. The patient is very emotional, voluble, and decidedly self-centered; she is thin and pale and appears to be very distressed. The central nervous system is negative, excepting for exaggerated knee-jerks; there are no obvious signs of hyperthyroidism. The pulse is slightly accelerated, soft and regular; blood-pressure is 150 systolic and 95 diastolic. The heart examination reveals a loud aortic stenotic murmur.



FIG. 2.—Taken erect immediately after Fig. 1. The bismuth-filled pouch occupies the same position, but is seen to be entirely separated from the stomach.

The abdomen is of the enteroptotic type, with a colonic bulge; the right kidney is displaced down to the iliac crest while the left one is ptosed to the second degree. The spleen and liver are not palpable. There is an old firm appendix scar. The gall-bladder region is very tender to pressure, the pain being referred to the right nipple. There is a definite stomach splash, with the greater curvature apparently slightly below the umbilicus.

The feces are soft and bulky, not formed, have a sour odor and strong acid reaction; they show poor starch digestion and are intermixed with a large amount of thick, ropy mucus. Occult

blood is absent and the bile reaction is normal. In the fasting state the stomach is empty, and one hour after Ewald-Boas' breakfast, 2 ounces of contents were aspirated, evidencing no special variation from the normal, and giving 28 free HCl and 60 total acidity.

From the above data the case was regarded as one of chronic inflammatory disease in the gall-bladder-duodenal region, the exact nature of which could not be stated. Chronic duodenal ulcer with possible gall-bladder involvement or adhesions seemed most probable.



FIG. 3.—Colon enema plate taken ninety-six hours after Fig. 1. There is still a definite though slight amount of bismuth in the duodenal pouch.

January 18, a gastro-intestinal roentgen-ray examination, made by Dr. Arthur S. Unger, gave the following results: The stomach is normal in shape, size, and position; its peristalsis is very active, and it is completely empty within six hours. The bulbous duodeni is large and appears overfilled; the cap is normal in contour; part of the first and second portions of the duodenum appear to adhere closely to the liver. Near the commencement of the third portion of the duodenum a distinct bismuth-filled dilatation is seen. It is round and pouch-like in shape and seems to communicate with the duodenum. Serial plates show bismuth retention in this pouch for at least ninety-six hours. In view of these roentgenological findings, the long-standing nature of the case, its resistance to medical therapy, and the recent aggravation of the subjective symptoms, surgical intervention was regarded as the only possible means of relief.

The patient was operated on by Dr. Charles A. Elsberg, January 31. The following was Dr. Elsberg's account of the operation:

An incision of 10 cms. was made through the right rectus. When the peritoneum was opened the pylorus and first and second portions of the duodenum were found to be congested and bound together by numerous fine adhesions. There was no evidence of an ulcer of

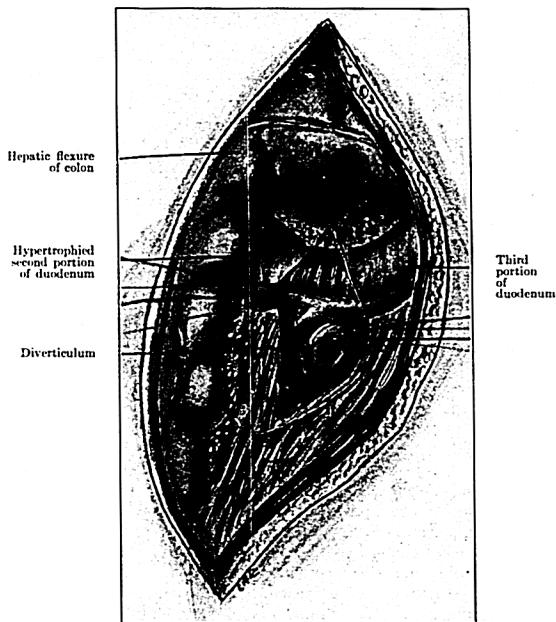


FIG. 4.—Congenital diverticulum of the duodenum at the junction of the second and third portions.

the stomach or the duodenum. The colon was then turned upward the posterior layer of the transverse mesocolon incised, and the third portion of the duodenum exposed. On the lower margin of the duodenum at the angle between the second and third portions was a large diverticulum measuring about 3 x 4 cms., its base about 3 cms. in diameter. The second portion of the duodenum was mark-

edly dilated and hypertrophied, while the third portion was normal in size. The diverticulum was excised at its base in the longitudinal direction, and the opening in the duodenum closed in the transverse direction by a double layer of fine silk sutures. The posterior layer of the mesocolon was then closed by catgut sutures being attached to the suture line and the duodenum. There was no narrowing of the duodenum as a result of the suture. A typical posterior gastro-enterostomy by suture was then performed and the abdomen closed in the usual manner.

The gastro-enterostomy was made because of the periduodenal adhesions and the duodenal dilatation.

The specimen was examined by Dr. E. P. Bernstein, who reported as follows:

Macroscopically the specimen is an intestinal pouch about 3 x 3 x 4 cms., with very thin walls.

Microscopic examination shows the peritoneal coat to be intact and normal; the muscular layer is intact but very thin throughout the entire specimen. The mucous membrane shows numerous defects with loss of the entire mucosa. Where, however, the mucous membrane is present it is normal in character and shows no inflammatory reaction, either acute or chronic.

Diagnosis. We must consider this specimen to be a congenital diverticulum. The loss of mucosa in spots is an artefact.

The patient made a good primary recovery from the operation, and in the short time that has elapsed shows a decided improvement in her digestion. However, in view of the presence of the extensive adhesions, the greatly dilated second portion of the duodenum, the marked enteroptosis, the obstinate constipation, the aortic lesion, and the highly neurotic condition of the patient, anything approaching a complete restoration to health is not to be expected.

This very unusual case is as far as I can learn from an exhaustive study of the literature only the second one to have been diagnosed during life and successfully operated on. The first case reported was one by Forssell and Key² in 1915. In their case the location of the diverticulum and the roentgen-ray and operative findings were very similar to those in the one herewith reported. Their patient also had suffered for many years from symptoms of duodenal ulcer. Forssell and Key state that their patient was entirely free from her symptoms after the operation.

It is unnecessary to enter here into any extended discussion of the subject of duodenal diverticulum. Those interested are referred to the writings of Buschi,³ Bauer,⁴ Wilkie⁵ and others mentioned in the appended literature. A few remarks intended to

² Nord. Med. Arkiv., Stockholm, 1915, Afd. II (Inre Medicin.), Heft. 1, No. 2.

³ Virchows Arch., 1911, Bd. xxvi, S. 121.

⁴ Wien. klin. Wchsch., 1912, Nr. 23, S. 579.

⁵ Edinburgh Med. Jour., September, 1913.

bring out the main points of general interest on the subject may be permitted.

As already stated, duodenal diverticula are of comparatively rare occurrence. There are only between 65 and 70 cases altogether reported in literature. Undoubtedly, the condition is much more frequent than these figures leave one to conclude, for it is easily overlooked unless specially sought for.

According to Buschi, from whose comprehensive study, in 1911, the following facts have mainly been gathered, Chomel,⁶ in 1707, reported the finding of a duodenal pocket containing 22 stones at an autopsy on a woman, aged eighty years. This patient, Chomel stated, had always felt a pain at the site of the sac about two hours after meals. Morgagni,⁷ in 1839, however, gave the first real description of a duodenal diverticulum.

Duodenal diverticula have been found twice as often in the bodies of males as in those of females, about 80 per cent. of them in individuals over fifty years of age. Over 75 per cent. of the diverticula were located in the second portion of the duodenum, and more especially in the region of the papilla of Vater, and of the opening of the duct of Santorini; hence, the French designation of "*diverticules perivateriens*." Of 44 cases tabulated by Buschi, the second portion of the duodenum was involved 33 times, the first 6, the third 3, and first and second in the same individual twice. In most instances only one diverticulum has been found in a case, although as many as five have been reported. Thus, Buschi found 35 cases with a single diverticulum, 13 with two, 2 with four, and 2 with five diverticula. The shape varied, being usually spherical or hemispherical; it may, however, be ovoid or like a gloved finger.

In size these pouches range from a few millimeters to 5 cms. in their greatest diameter. The opening may be narrower, but usually is fully as wide or even wider than the cavity of the sac. In a few instances a valve-like fold has been seen at the opening. The width of the opening and the shallowness of the pouch prevent the disastrous consequences so common in Meckel's diverticulum and the vermiform appendix.

The sac has generally been found empty and flaccid; at times, however, it has contained fluid or food remnants, or even stones.

Most investigators report the sac wall as being composed entirely of mucous membrane and submucosa, the mucous membrane being smooth, thin and free, or almost free, from glands. The muscular layer is said to be absent or to appear only as a ring about the opening of the pouch. Buschi, Voelker,⁸ Seipel⁹ and others,

⁶ Histoire de l'Acad. royale, Paris, 1710.

⁷ De sedibus et causis morborum, etc., Firenze, 1839.

⁸ Beitrag zur Kenntnis d. falschen Darmdivertikeln, Inaug. Dissert., Freiburg, 1906.

⁹ Ueber erworbene Darmdivertikel, Inaug. Dissert., Zürich, 1895.

however, found perfectly normal mucosa and some muscle bundles which extended far into the sac, in some instances even to the distal end, being then very atrophic. In our own case the pathologist reports that "the muscular layer is intact, but very thin throughout the specimen."

Diverticula occur only exceptionally on the outer or anterior surfaces of the duodenum; in most instances they are on the inner aspect in contact with the head of the pancreas, from which they are separated by loose connective tissue. Frequently they indent the head of the pancreas, or are intimately connected with the common bile duct or the duct of Wirsung, which usually lie behind the diverticula.

The question of the origin of these diverticula has given rise to much discussion and to a number of interesting theories. Those interested in the details are referred to the papers of Buschi, Wilkie, and Davis,¹⁰ in which the question is gone into at length. Buschi himself concludes that they are to be regarded as of congenital origin, and gives detailed reasons for his conclusions. He states, however, that the possible occurrence of false or acquired diverticula through stones, tumors, ulcers, and similar causes cannot be disputed.

Until the publication of Bauer's two cases in 1912 no serious clinical or pathological significance was attached to duodenal diverticula. In Bauer's first case there had been signs of pyloric obstruction, and, despite a posterior gastro-enterostomy, the patient died ten days after the operation. The autopsy showed two duodenal diverticula, the larger one of which was about the size of a hen's egg, and situated on the inner pancreatic aspect, involving both the common bile and Wirsung's ducts. Bauer believed that this sac through tension when full caused an insufficiency of the pylorus and a stenosis of the duodenum. In Bauer's second case the duodenal diverticulum was an accidental postmortem discovery. It was filled with a feculent mass, and the duodenum itself was much inflamed and coated with tough, tenacious mucus; the papilla of Vater was inflamed and swollen and closed by a mucous plug. The common bile duct was dilated and the gall-bladder widely distended and filled with stagnant bile. Bauer concluded that in all probability the diverticulum through its feculent contents was the cause of the inflammatory changes in the duodenum and in the bile passages. In two of Wilkie's cases the diverticula were associated with grave disturbances in the adjacent organs, viz., duodenitis and biliary stasis in both cases, while in the first case, there was also an hepatic cirrhosis and in the other an acute hemorrhagic pancreatitis. Wilkie is unwilling, however, to say with certainty that the diverticula were responsible for all the biliary and pancreatic troubles, but thinks there is strong presumptive evidence of an etiological relationship.

¹⁰ Tr. Chicago Pathol. Soc., February, 1913.

In addition to these 4 cases of definite secondary or associated pathological changes reported by others, the radiographic studies of Forssell and Key's case and of my own have unquestionably demonstrated that food and other solid duodenal contents can and at times do enter into these pouches, and remaining there at least four days must undergo fermentation or stagnation, giving rise to very unpleasant local and even far-reaching secondary effects. The marked distention of the second portion of the duodenum and the hypertrophy of its walls in my own case were undoubtedly due to efforts on the part of the gut to force out the contents of the diverticulum. Many of these cases, like Forssell and Key's and the one herewith reported, undoubtedly go on for years with symptoms very suggestive of duodenal ulcer. Now, these cases cannot be diagnosed clinically unless they have real pouch formations which present unmistakable roentgen-ray pictures; frequently, they are so located that ordinary exploratory laparotomy does not reveal them and even at autopsy they may be overlooked unless specially sought for. Is it not therefore possible that a case of clinically suspected duodenal ulcer, reported as not present by the surgeon after operation, may after all at times have been one of these diverticula or even a real ulcer situated not in the usual site, viz., the first portion of the duodenum, but in the second or third portion?

CONCLUSIONS. 1. Duodenal diverticula are of more frequent occurrence than would appear from the number of reported cases.

2. Unless specially sought for they are easily overlooked at operation or autopsy.

3. They can be diagnosed by roentgen-ray examination when they form distinct pouches.

4. They may produce symptoms sufficient to require surgical interference.

5. They can be cured by operation.

THE USE OF RAW EGGS IN PRACTICAL DIETETICS.

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DURING the past fifteen years evidence has been gradually accumulating which shows that raw egg-white occupies an exceptional position among native protein foodstuffs. Pawlow (1902) observed that this substance has only a feeble ability to stimulate a flow of gastric juice. It acted in this way only as so much water.